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Claims

A multi-photon luminescence microscope (M) with an excitation beam path comprising an objective (2) which focuses excitation radiation (1) in a focal point (4) in the sample (5), a scanning unit which shifts the focal point (4) at least one-dimensionally, and a detecting unit which picks up luminescence radiation stimulated by multi-photon excitation in the sample, characterized in that the detecting unit comprises an area detector (9) which is located on the side of the sample (5) opposite the objective (2).

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- 2. The microscope as claimed in Claim 1, characterized in that the area detector (9) is spaced apart from the focal point (4) by a distance (d) which is small as compared to the extent (b) of the area detector (9) in order to cover as large a space angle (K) as possible.
- 15 3. The microscope as claimed in any one of the above Claims, characterized in that a preferably holographic grating (8) is arranged between the area detector (9) and the sample (5).
 - 4. The microscope as claimed in Claim 3, characterized in that the grating (8) is applied to the bottom surface of a sample carrier (7).

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- 5. The microscope as claimed in any one of the above Claims, characterized by a spatially resolving area detector (9).
- 6. The microscope as claimed in Claim 5, characterized by a CCD area detector (9), preferably as a back-illuminated CCD sensor.
 - 7. Method of multi-photon luminescence microscopy, wherein excitation radiation (1) is focused in a focal point (4) located in a sample (5), whereby luminescence radiation is stimulated by multi-photon excitation in the sample (5), wherein for scanning the sample (5) the focal point (4) is shifted, and the luminescence radiation is detected, **characterized in that** the

luminescence radiation on the side located opposite the irradiation of the excitation radiation is detected in a flat-spread manner.

8. The method as claimed in Claim 7, characterized in that spectral dispersion of the luminescence radiation is effected prior to detection.